

# Informational Leaflet 47

## SOUTHEASTERN ALASKA PINK SALMON FORECAST STUDIES PRE-EMERGENT FRY PROGRAM

By:

Theodore C. Hoffman  
Division of Biological Research

January 28, 1965

STATE OF ALASKA  
WILLIAM A. EGAN - GOVERNOR  
  
DEPARTMENT OF  
FISH AND GAME  
WALTER KIRKNESS - COMMISSIONER  
SUPPORT BUILDING, JUNEAU



## SOUTHEASTERN ALASKA PINK SALMON FORECAST STUDIES

### PRE-EMERGENT FRY PROGRAM

#### Introduction

The Division of Biological Research of the Alaska Department of Fish and Game began preparations in the summer of 1962 for a pre-emergent fry indexing program in Southeastern Alaska for the purpose of predicting the abundance and distribution of adult pink salmon returning from estimated levels of fry production. Prior to the spring of 1963, ten streams had been examined to assess the spawning area and to prepare for random fry sampling. The ten streams were sampled for density of pre-emergent fry in the spring, using the hydraulic sampler described by McNeil (1962). An average of 45 samples were taken daily by a two-man crew and the number of samples obtained indicated the feasibility of extensive sampling over large areas of spawning at relatively low cost. At this point of the program development the need and possibility for expanding the sampling effort was evident.

In the summer of 1963, 85 streams in Southeastern Alaska were examined to determine their suitability for sampling the following spring. Areas were designated and surveyed in those streams which appeared suitable for inclusion in the sampling stratum. Areas from 60 of the streams were selected for sampling in the spring of 1964 and of these 53 were sampled. Data from these 53 streams are presented in this report. The maximum number of samples taken daily by a three-man crew in the spring of 1964 was between 60 and 90 depending upon fry densities observed in the sampling areas. Figures 1, 2, 3, and 4 indicate the locations of streams that were sampled in 1964.

Additional survey activity in the summer of 1964 was primarily directed toward expanding stream sampling to the following areas of Southeastern Alaska; Western Chichagof Island, Icy Strait, Rocky Pass, Tebenkof Bay, and Behm Canal. Figures 1, 2, 3, and 4 indicate the location of the streams considered suitable for inclusion in the 1965 sample stratum.

#### Objectives

1. To develop a pre-emergent fry index method for predicting the abundance and distribution of pink salmon returning to their respective spawning areas in Southeastern Alaska.
2. To gather basic information on the productivity of the areas sampled.
3. To determine whether the same method of prediction can be extended to chum salmon.

#### Methods

The sampling system presently in use was suggested by Dr. W.J. McNeil, Bureau of Commercial Fisheries, Auke Bay Laboratory. Briefly, the goal is to estimate

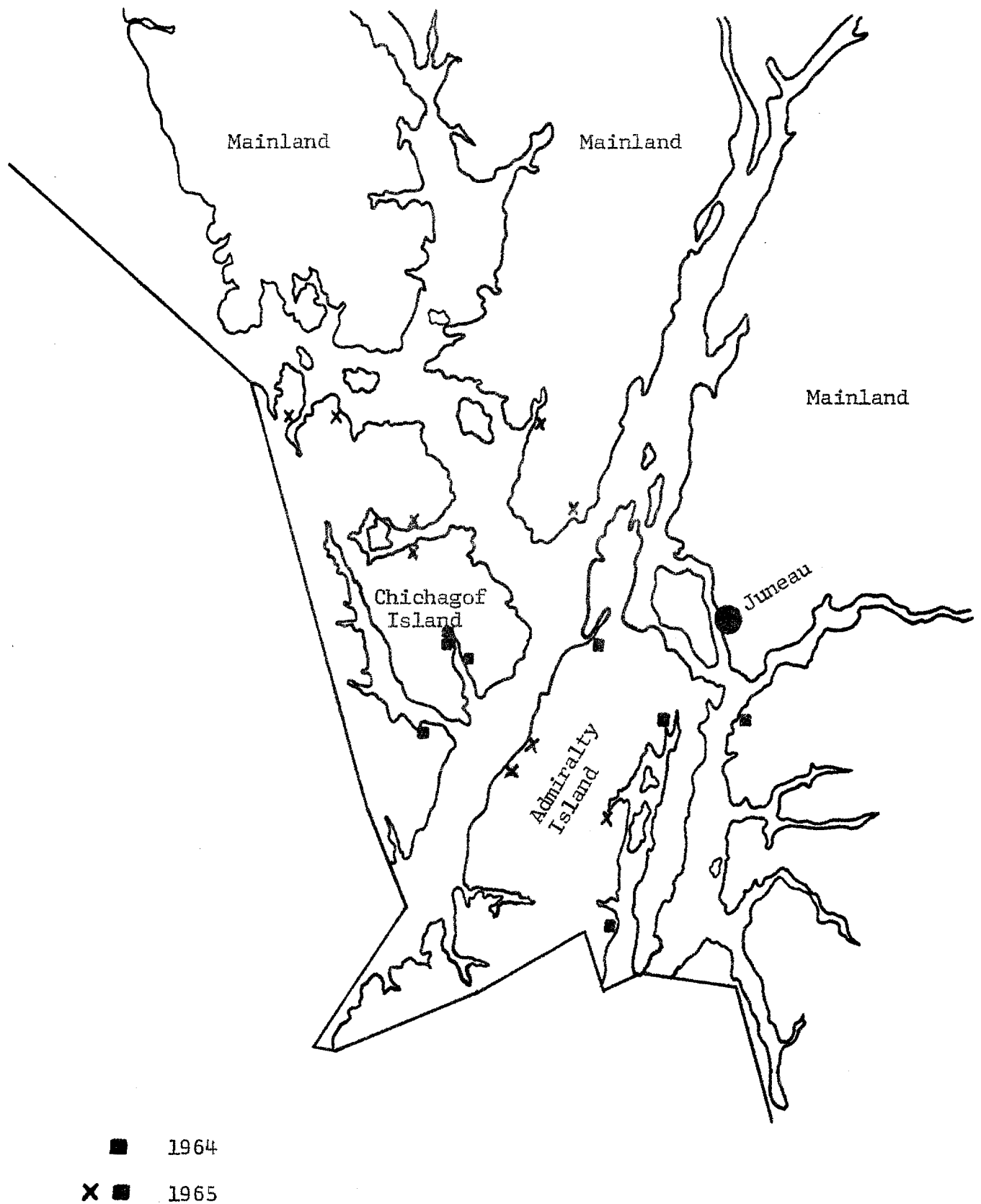


Figure 1. Map of Southeastern Alaska, Juneau District, showing streams sampled in 1964 and those to be added to the sample stratum in 1965.

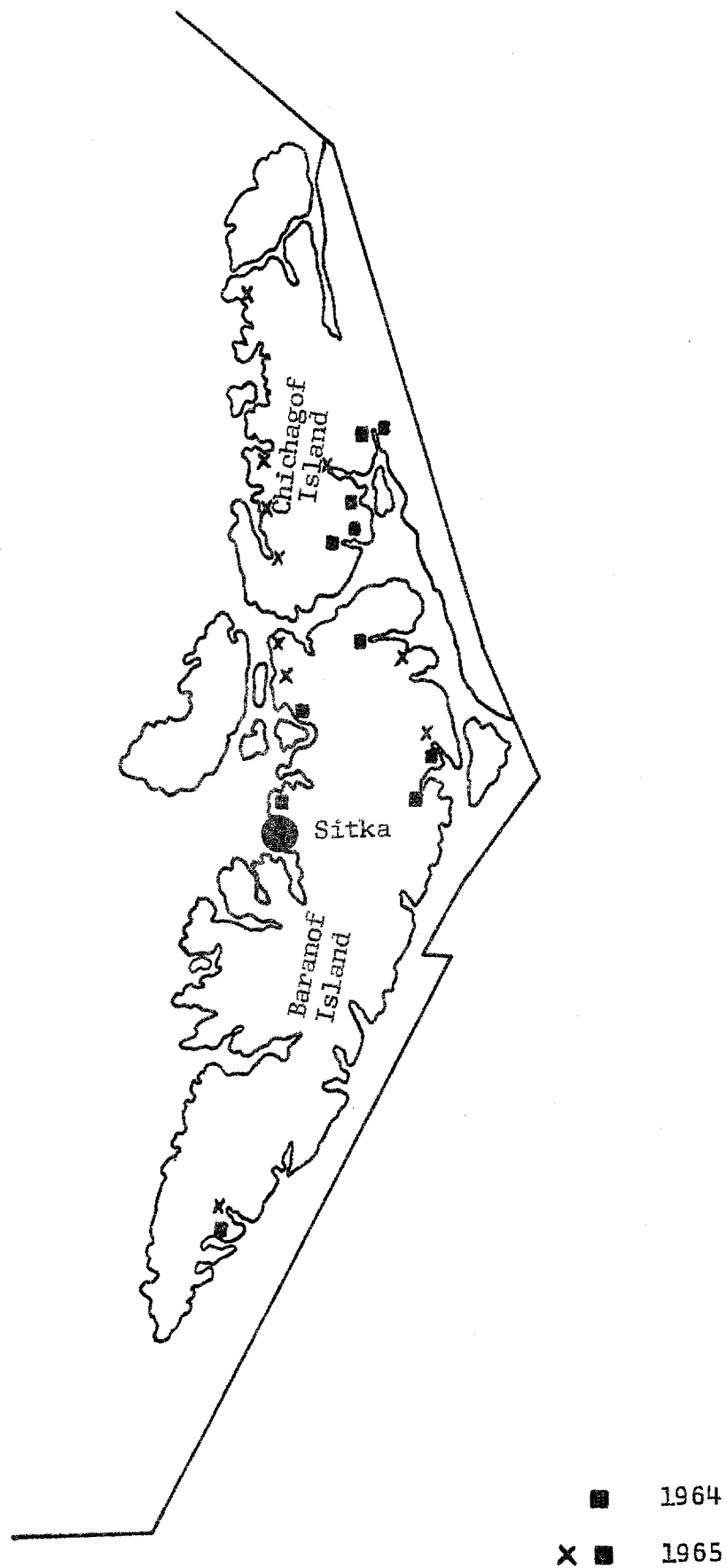


Figure 2. Map of Southeastern Alaska, Sitka District, showing streams sampled in 1964 and those to be added to the sample stratum in 1965.

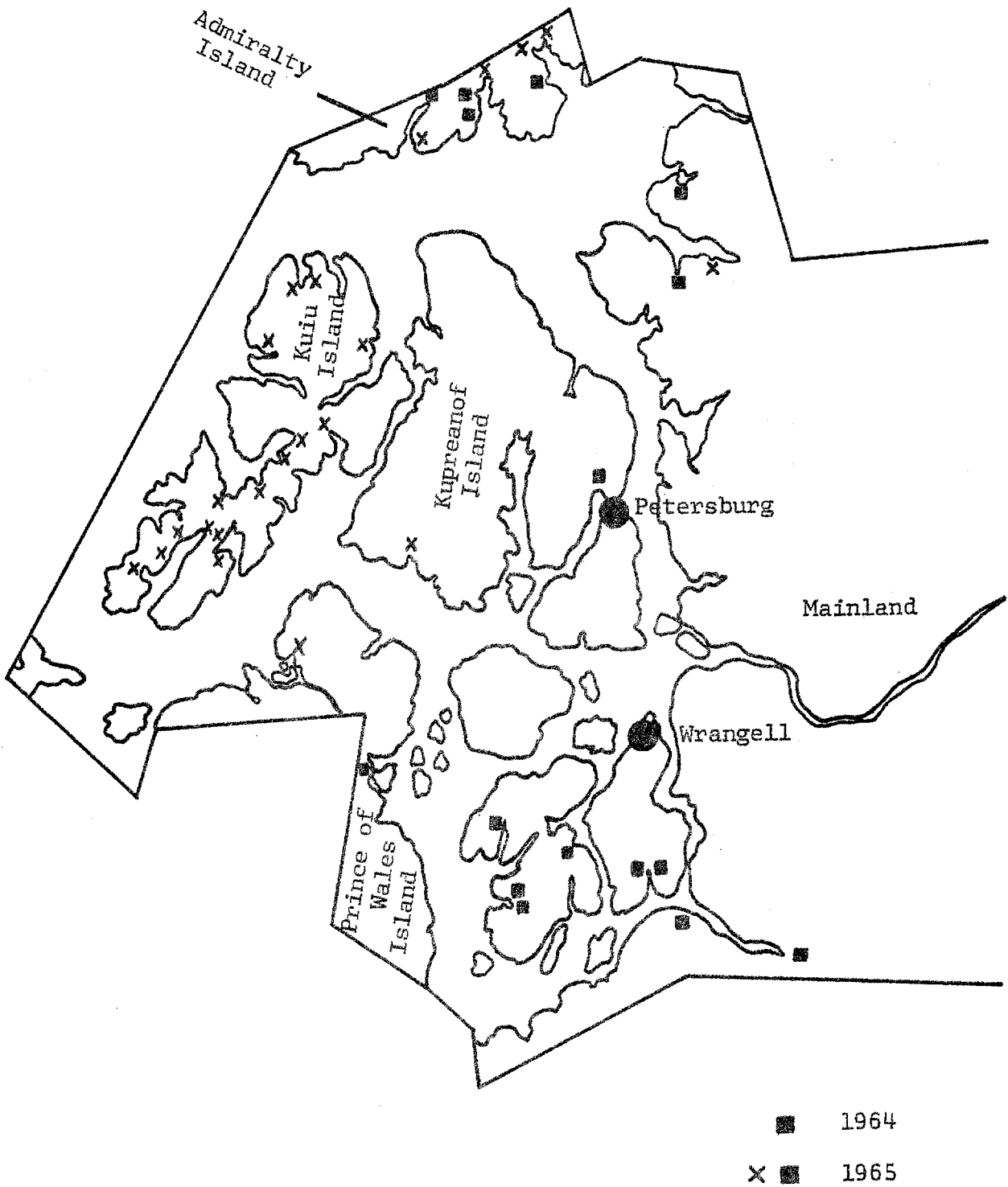


Figure 3. Map of Southeastern Alaska, Petersburg District, showing streams sampled in 1964 and those to be added to the sample stratum in 1965.

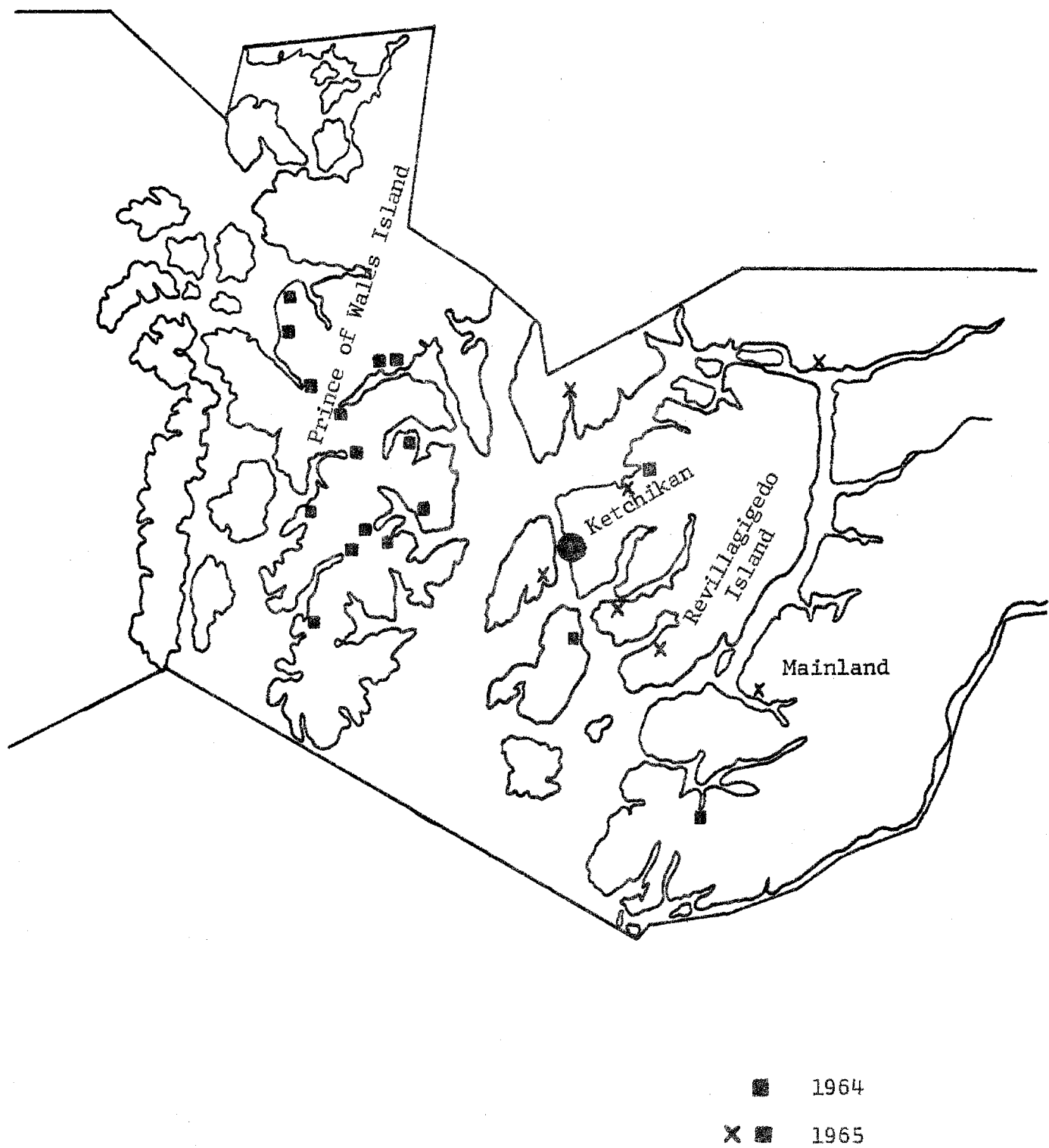


Figure 4. Map of Southeastern Alaska, Ketchikan District, showing streams sampled in 1964 and those to be added to the sample stratum in 1965.

the fry production in all stream areas utilized by pink salmon for spawning which are accessible to sampling crews. Although both good and poor producing streams are included in the basic sampling program, each may be considered as a separate stratum to determine which type of stream provides the best index of the major fluctuations in the size of the total returning run of adults to Southeastern Alaska. Sampling effort will be allocated to the streams included in the sampling program on the basis of areas available for spawning and accessibility to sampling crews.

The basic sampling program is designed so that additional stream area may be added to any future time without sacrificing previously acquired data. With the inclusion of more spawning areas, some scheme of randomized cluster sampling of these areas will be adopted to maintain a high degree of efficiency in sampling.

The program will provide estimates of pre-emergent fry abundance per unit area of spawning bed (e.g., per square meter). This estimate multiplied by the area of a stratum will give an estimate of total fry yield from the stratum.

With the exception of the ten streams sampled in 1963 there is no stream or area adult return relationship established at this time. Interpretation of the statistics on the spawning return to the streams is difficult without knowing the effect of the fishery on the returning adult populations because the catch cannot be assigned to individual streams. An attempt will be made to assign escapement to larger geographical or unit areas where the catch can be more accurately delegated.

To predict returning adult populations from pre-emergent fry densities it is necessary to assume that a relationship exists between fry produced and the resulting adult return. To date Noerenberg's (1964) (1963) (1961) pink salmon prediction work in Prince William Sound supports this assumption and his predictions have been sufficiently accurate to make these quite valuable in the management and harvest of that fishery.

The Southeastern Alaska pink salmon prediction program is at an early stage of development and at this time lacks sufficient stream sample distribution. In addition, a history of pre-emergent fry-density return relationships is necessary to establish an expected numerical return. For these reasons, although overall and inter-area statistical comparisons have been made for the Southeastern data to lay the groundwork in developing numerical predictions, they will be omitted from this report.

The observed fry abundance used alone is a good indicator of the success of the parent escapement and probably also of the 1965 returning pink salmon runs and their distribution within the areas sampled.

#### Observations During the Spring of 1963

Information on abundance of fry was obtained from ten streams during late March and April of 1963. Hydraulic sampling of pre-emergent fry was employed in all streams except Disappearance Creek, where downstream migrants were trapped at the mouth of the stream. Data on Traitors Cove and Lovers Cove creeks were obtained from the Bureau of Commercial Fisheries and on Twelvemile Creek from

the Fisheries Research Institute, University of Washington. Parent escapements, area sampled, and recovery by species for sections of streams examined in 1963 are listed alphabetically in Table 1.

### 1963 Escapements

General levels of the 1963 parent escapement for Southeastern Alaska are presented below by management district. Adjective ratings are merely descriptive and based in part upon escapements observed in these districts over the past five years.

#### Juneau District:

Escapement in the Juneau District was generally very good and for most streams exceeded the five-year average escapement levels. Both large streams (considered primary producers) and small stream systems received good escapements.

The only areas having relatively poor escapements were: the west side of Lynn Canal above Howard Bay and the east shore of Lynn Canal from Berners Bay and continuing down the mainland shore to Point League with the exception of fair to good escapements in the Slocum Bay-Limestone Inlet area.

Evaluation of the escapement into the northern Lynn Canal stream and Glacier Bay areas is generally sketchy because of the nature of the drainages involved. Reference Figure 5.

#### Sitka District:

Escapement in the Sitka District was very good for all areas except south of West Crawfish Inlet on the west coast of Chichagof which was poor. Reference Figure 6.

#### Petersburg District:

Escapement in the Petersburg District was considered to be generally average to good with two poor areas observed on Kuiu Island, specifically in Affleck Canal and Port Camden.

Areas of good escapement were observed in Pybus and Gambier Bays located on Admiralty Island, Saginaw Bay, Rowan Bay, and Bay of Pillars located on Kuiu Island, and generally in the southern island areas of the district. Prince of Wales Island escapement was good with the exception of the Red Bay area which had only average escapements. Bradfield Canal was the only area on the mainland with escapements considered to be good.

Average escapements were observed in most of the area south of Point League on the mainland and the central island areas with the exceptions mentioned above. Reference Figure 7.

#### Ketchikan District:

The Ketchikan District experienced good escapements in the following three areas: Carroll Inlet, from Port Caldera north to Salt Lake Bay and Nossuk Bay north to

Table 1. Parent escapements and pre-emergent fry densities observed in areas of Southeastern Alaska streams, 1962, 1963, and 1964.

Stream Number	Name and Location	Sample Year	Parent Escapement	Area Sampled	#.19 sq. m Samples	Mean fry density per Chum	.1 sq. meter Pink
18	Anan Creek, Bradfield Canal, Mainland	1964	200,000 <sup>1</sup>	16,622 sq.m	198	0.0	42.5
14A	Corner Bay, Tenakee Inlet, Chichagof Island	1964	700 <sup>1</sup>	2,809	30	0.0	17.9
K150	Disappearance Creek, Chomley Sound, Prince of Wales Is.	1963	143 pinks <sup>3</sup> 23,799 chums <sup>3</sup>	17,658	----	19.5 <sup>2</sup>	negligible
		1964	223 pinks <sup>3</sup> 40,318 chums <sup>3</sup>	17,658	140	40.7	1.5
14	Eagle River, Bradfield Canal, Mainland	1964	6,000 <sup>1</sup>	3,372	38	0.0	6.0
26	Eliza Bay, Admiralty Island	1964	8,000 <sup>1</sup>	2,168	27	0.0	6.7
27A	Fick Cove, Peril Straits, Chichagof Island	1964	18,000 <sup>1</sup>	3,645	45	1.4	28.8
23	Fools Inlet, Wrangell Is.	1964	-----	2,094	27	0.0	0.4
24	Fools Inlet, Wrangell Is.	1964	1,200 <sup>1</sup>	2,650	33	0.0	8.8
4	Freshwater Bay, Chichagof Island	1964	57,500 <sup>1</sup>	2,200	25	0.0	30.9
4B	Freshwater Bay, Chichagof Island	1964	2,000 <sup>1</sup>	648	8	0.0	22.4
4C	Freshwater Bay, Chichagof Island	1964	2,500 <sup>1</sup>	1,459	15	0.0	20.4
19	Gambier Bay, Admiralty Is.	1964	1,200 <sup>1</sup>	5,662	56	0.9	8.5

(Continued)

Table 1. Parent escapement and pre-emergent fry densities observed in areas of Southeastern Alaska streams, 1962, 1963, and 1964 (continued).

<u>Stream Number</u>	<u>Name and Location</u>	<u>Sample Year</u>	<u>Parent Escapement</u>	<u>Area Sampled</u>	<u>#.19 sq. m Samples</u>	<u>Mean fry density per Chum</u>	<u>.1 sq. meter Pink</u>	
K176	Harris R., Kasaan Bay, Prince of Wales Island	1963	80,000 <sup>4</sup>					
				Area 1A Intertidal	1,950 sq.m	103	negligible	negligible
				Area 1B Intertidal	5,859	50	0.0	15.5
				Area 2B Upstream	7,180	51	0.0	7.5
		1964	60,000 <sup>1</sup>					
				Area 0	1,874	30	0.0	0.5
				Area 1A	1,950	20	0.0	0.0
				Area 1B	5,859	50	0.0	10.7
				Area 2A	4,329	33	0.0	2.0
				Area 2B	7,180	25	0.0	1.2
				All upstream area	17,368	108	0.0	5.9
				All downstream area	3,824	50	0.0	0.3
43	Hawk Inlet, Admiralty Is.	1964	13,000 <sup>1</sup>	2,867	40	3.6	38.0	
WC12	Hetta Inlet, Prince of Wales Island	1964	----	3,399	32	14.4	44.2	
WC14	Hetta Inlet, Prince of Wales Island	1964	7,000 <sup>1</sup>	2,529	28	0.0	35.4	
4B	Hobart Bay, Mainland	1964	13,000 <sup>1</sup>	12,962	130	7.1	9.6	
24	Hoonah Sound, Peril Straits, Chichagof Island	1964	15,000 <sup>1</sup>	5,112	50	0.0	40.5	

(Continued)

Table 1. Parent escapements and pre-emergent fry densities observed in areas of Southeastern Alaska streams, 1962, 1963, and 1964 (continued).

<u>Stream Number</u>	<u>Name and Location</u>	<u>Sample Year</u>	<u>Parent Escapement</u>	<u>Area Sampled</u>	<u>#.19 sq. m Samples</u>	<u>Mean fry density per Chum</u>	<u>.1 sq. meter Pink</u>
25	Hoonah Sound, Peril Straits, Chichagof Island	1964	17,000 <sup>1</sup>	3,008 sq.m	30	0.0	25.8
K21	Humpback Creek, Revillagigedo Island	1964	97,000 <sup>1</sup>				
			Upstream <sup>4</sup>	9,636	5	0.0	57.9
			Downstream	95,874	195	0.0	9.4
K176-1	Indian Creek, Kasaan Bay, Prince of Wales Island	1964	----				
			Above channel	5,779	58	0.0	10.3
			Channel	4,843	48	0.0	4.1
40	Kelp Bay, Baranof Island	1964	12,000 <sup>1</sup>	3,264	35	0.0	34.2
41	Kelp Bay, Baranof Island	1964	45,000 <sup>1</sup>	8,357	85	11.0	27.9
12	King Salmon, Seymour Canal, Admiralty Island	1964	132,300 <sup>1</sup>				
			Helicopter sample upper stream	1,995	20	0.0	39.4
			Lower area (inter-tidal)	2,153	20	0.0	0.2
WC5	Klakas Inlet, West Coast Prince of Wales Island	1964	15,000 <sup>1</sup>	1,084	14	0.0	2.4
WC6	Klakas Inlet, West Coast Prince of Wales Island	1964	----	1,896	13	2.4	5.9
WC39	Klawak Creek, West Coast Prince of Wales Island	1964	67,000 <sup>1</sup>	4,800	24	0.0	25.7

(Continued)

Table 1. Parent escapements and pre-emergent fry densities observed in areas of Southeastern Alaska streams, 1962, 1963, and 1964 (continued).

Stream Number	Name and Location	Sample Year	Parent Escapement	Area Sampled	# .19 sq. m Samples	Mean fry density per Chum	.1 sq. meter Pink
K154	Lagoon Creek, Chomley Sound, Prince of Wales Is.	1964	10,400 <sup>1</sup>	2,409 sq. m	20	0.0	22.4
49A	Lovers Cove, Port Walter, Baranof Island	1963	----	2,742	65	0.2	8.8
		1964	2,500 <sup>5</sup>	2,742	50	3.6	18.5
34	McHenry Inlet, Etolin Is.	1964	4,500 <sup>1</sup>	2,472	24	0.0	5.3
35	McHenry Inlet, Etolin Is.	1964	5,500 <sup>1</sup>	3,789	35	0.0	3.6
38	Mosman, Etolin Island	1964	1,725 <sup>1</sup>	2,007	20	19.3	1.4
K112	Nadzaheen, Annette Island	1964	----	4,050	51	0.0	34.5
<sup>1</sup> 26B	Nakwasina, Sitka Sound, Baranof Island	1964	60,000 <sup>1</sup>	2,440	25	0.0	87.6
K163	Old Tom Creek, Kasaan Bay, Prince of Wales Island	1963	5,000 <sup>5</sup>	-----	50	4.0	7.3
		1964	1,000 <sup>1</sup>	2,743	33	6.0	0.3
55	Petersburg Creek, Kupreanof Island	1964	3,000 <sup>1</sup>	3,132	20	0.0	3.0
16	Pleasant Bay, Seymour Canal, Admiralty Island	1963	36,552 pinks <sup>3</sup> 1,697 chums <sup>3</sup>	3,820	18	0.0	42.7
		1964	40,000 <sup>1</sup>	3,928	45	0.0	21.6
WC37	Port St. Nicholas, West Coast, Pr. of Wales Is.	1964	9,200 <sup>1</sup>	4,577	56	0.0	21.7
5	Port Houghton, Mainland	1964	30,000 <sup>1</sup>	4,140	41	0.0	5.3
22A	Pybus, Admiralty Island	1964	970 <sup>1</sup>	1,355	15	negligible	1.5

(Continued)

Table 1. Parent escapements and pre-emergent fry densities observed in areas of Southeastern Alaska streams, 1962, 1963, and 1964 (continued).

Stream Number	Name and Location	Sample Year	Parent Escapement	Area Sampled	# .19 sq. m Samples	Mean fry density per Chum	.1 sq. meter Pink
23	Pybus, Admiralty Island	1964	8,500 <sup>1</sup>	2,440 sq.m	25	0.0	0.2
34	Rodman Creek, Peril Straits, Baranof Island	1964	75,000 <sup>1</sup>	7,742	76	0.0	43.8
49	Sashin Creek, Baranof Is.	1964	16,753 <sup>1</sup>	13,629	128	negligible	32.2
1B	Slocum Inlet, Mainland	1964	3,000 <sup>1</sup>	----	25	0.0	4.1
29	Snake Creek, Olive Cove, Etolin Island	1963	93,645 pinks <sup>3</sup>	6,073	45	0.0	7.3
		1964	112,000 <sup>1</sup>	6,072	60	0.0	5.7
K156	Sunny Creek, Chomley Sound, Prince of Wales Island	1964	9,000 <sup>1</sup>	1,566	16	0.0	91.4
20	Starrigavan, Baranof Island	1964	6,000 <sup>1</sup>	5,531	55	0.0	14.8
WC36	Tracadero, West Coast of Prince of Wales Island	1964	22,000 <sup>1</sup>	3,283	36	0.0	26.5
K84	Traitors Cove, Revillagigedo Island	1963	30,000 pinks <sup>3</sup> 26,000 chums <sup>3</sup>				
			Area 20	1,538	100	6.2	13.5
			Area 24	1,602	100	17.1	19.8
		1964	23,000 <sup>1</sup>				
			Area 20	1,538	99	0.1	58.2
			Area 24	1,602	100	33.3	10.1
K175	Twelvemile Cr., Kasaan Bay, Prince of Wales Island	1963	17,000 <sup>5</sup>				
			Area I	5,680	50	negligible	5.3

(Continued)

Table 1. Parent escapements and pre-emergent fry densities observed in areas of Southeastern Alaska streams, 1962, 1963, and 1964 (continued).

<u>Stream Number</u>	<u>Name and Location</u>	<u>Sample Year</u>	<u>Parent Escapement</u>	<u>Area Sampled</u>	<u># .19 sq. m Samples</u>	<u>Mean fry density per .1 sq. meter Chum</u>	<u>Pink</u>
		1964	29,800 <sup>1</sup>				
			Area I	5,680 sq.m	50	0.0	2.0
27	Ushk Bay, Peril Straits, Chichagof Island	1964	6,000 <sup>1</sup>	1,242	12	0.0	28.5
28	Ushk Bay, Peril Straits, Chichagof Island	1964	7,000 <sup>1</sup>	1,712	20	0.0	46.6
108	Whale Pass, Prince of Wales Island	1963	128,339 pinks <sup>3</sup> 1,357 chums <sup>3</sup>				
			Intertidal area	1,847	35	0.0	12.9
		1964	134,499 pinks <sup>3</sup> 981 chums <sup>3</sup>				
			Area GS-1	1,129	50	0.0	24.7
			Area GS-2	1,566	50	0.0	13.2
			Area GS-3	1,847	50	5.4	3.1
			Acre plot	4,048	40	2.1	21.1
			All upstream area	6,743	140	1.1	19.6
			All intertidal area	1,847	50	5.4	3.1
14	Windfall Harbor, Seymour Canal, Admiralty Island	1963	2,676 pinks <sup>3</sup> 3,129 chums <sup>3</sup>	8,097	60	1.4	5.6

(Continued)

Table 1. Parent escapements and pre-emergent fry densities observed in areas of Southeastern Alaska streams, 1962, 1963, and 1964 (continued).

- 1 Peak escapement count included all species.
- 2 Calculated from migrant count divided by area of spawning gravel.
- 3 Weir count.
- 4 Area just below block to spawning salmon sampled experimentally was not included in survey at time stream surveyed.
- 5 Estimated total count.

NOTE: Sampling effort in both years based on 40 .19 sq. m samples per 4,048 sq. m. Variable effort noted above allocated to areas of special concern in conjunction with other existing programs or represents data contributed from other sources.

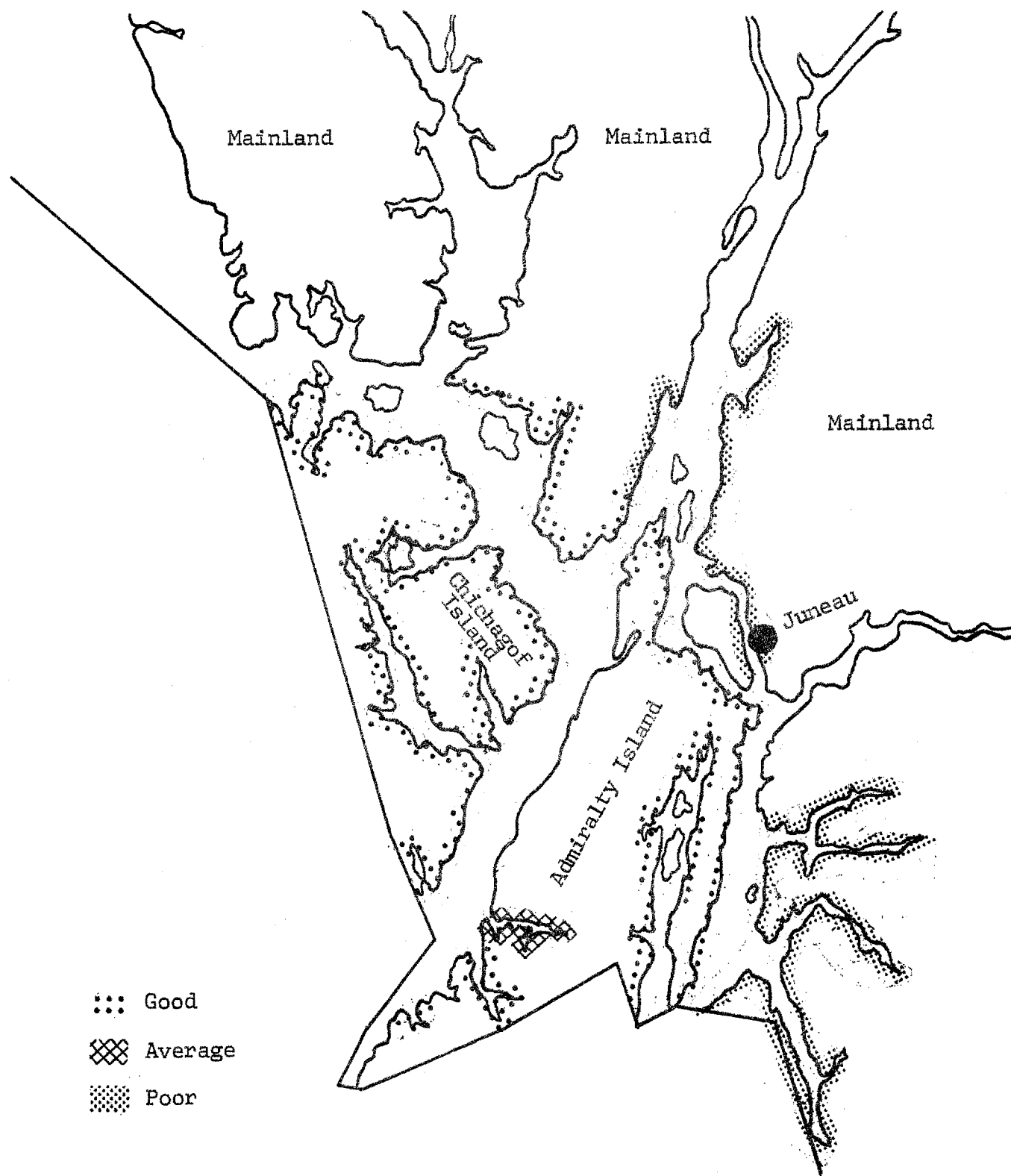


Figure 5. Relative levels of escapement in the Juneau District in 1963.

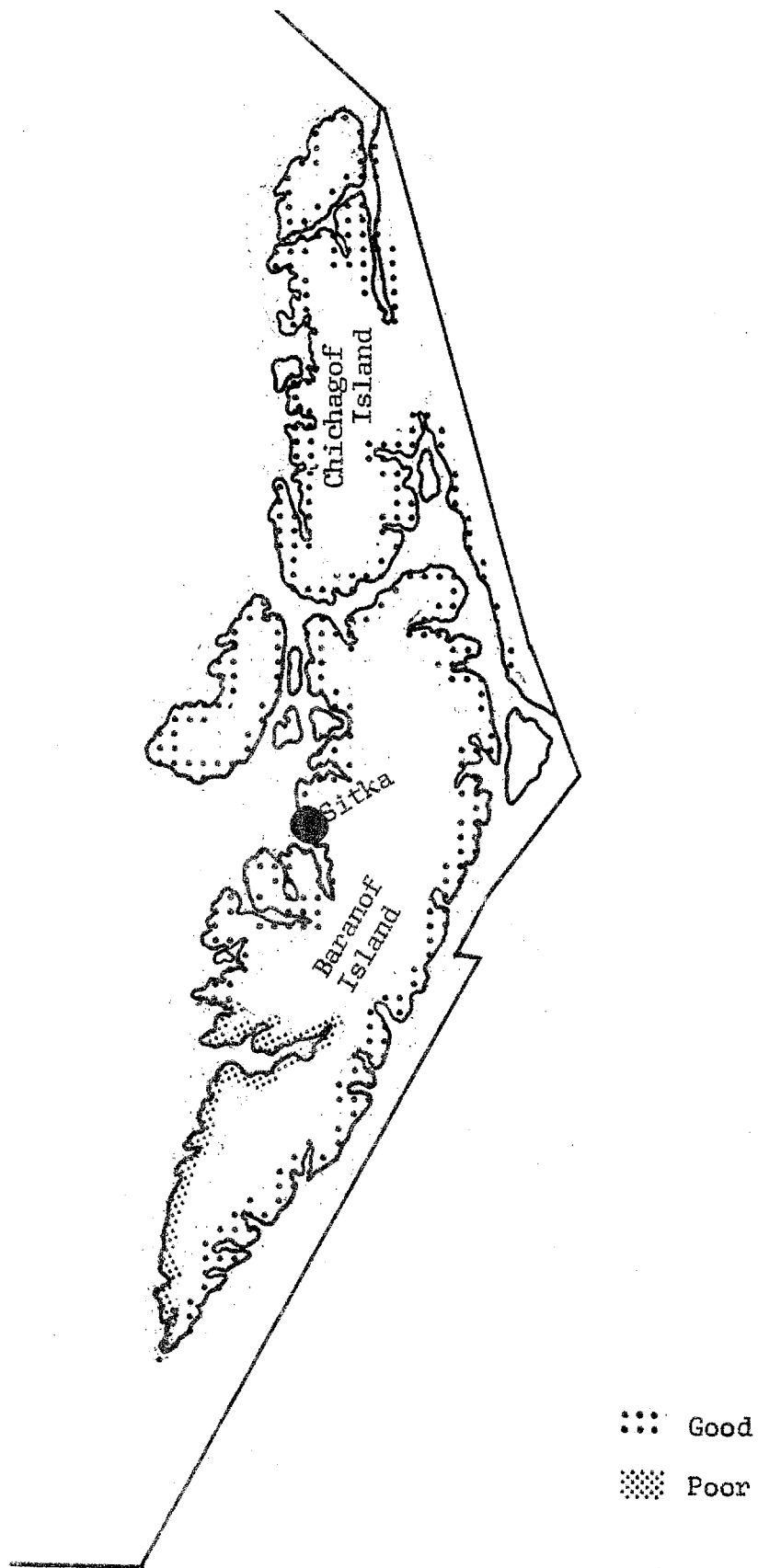


Figure 6. Relative levels of escapement in the Sitka District in 1963.

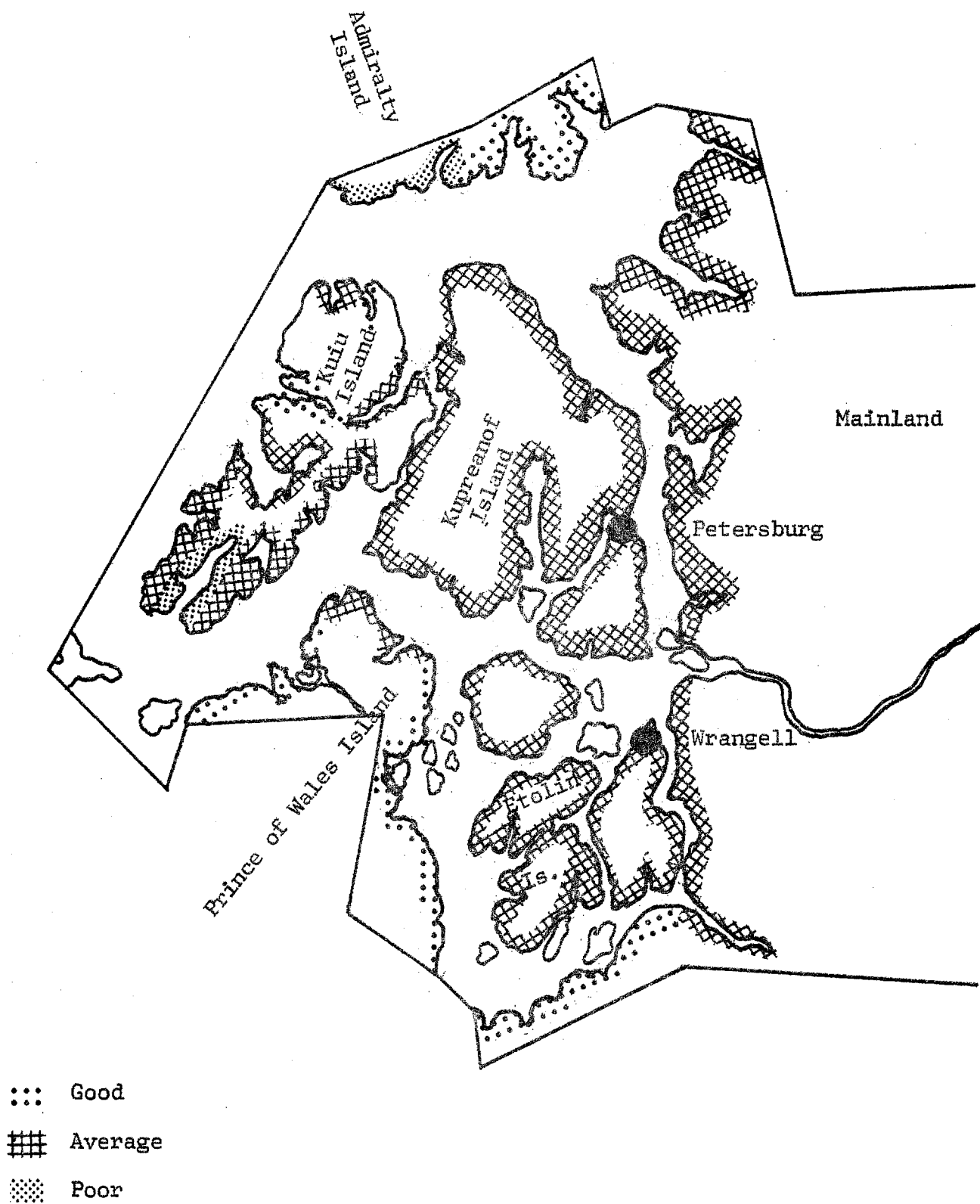


Figure 7. Relative levels of escapement in the Petersburg District in 1963.

Token on the west coast of Prince of Wales Island.

Two rather large areas of poor escapements were observed in this district; one between Point Marsh and Port Johnson on the east coast of Prince of Wales Island and from the southern end of Behm Canal and then north and west to Neets Bay.

Average escapements with some minor exceptions were general throughout the rest of the Ketchikan District. Reference Figure 8.

#### Observations During the Spring of 1964

Information on abundance of pre-emergent fry was obtained from sections of 53 streams during the period February 15, 1964 to April 6, 1964. Two three-man crews working from the Department vessels, M/V HARLEQUIN, AUKLET, and KITTIWAKE were involved in the sampling activity. Data from Traitors Cove, Lovers Cove, and Sashin Creeks were obtained from the Bureau of Commercial Fisheries Auke Bay Laboratory and on Harris River and Twelvemile Creek from the Fisheries Research Institute, University of Washington. Parent escapements, area sampled, and recovery by species for sections of streams examined in 1964 are listed alphabetically in Table 1. Reference Figures 9, 10, 11, and 12 show the pattern of pre-emergent fry abundance by districts in spring 1964.

#### Discussion

Intertidal mean pink salmon fry density in Prince William Sound in the magnitude of 29 fry per .1 sq. m produced an excellent return run in 1962 and two observations in the magnitude of 15 to 20 fry per .1 sq. m produced a fair return run in 1963 and 1964. Two observations below 10 fry per .1 sq. m produced poor return runs in 1959 and 1960 (Noerenberg, 1964, 1963, 1961).

Using the above as a basis of comparison for projecting the expected run for 1965 in areas of Southeastern Alaska might well be hazardous. There is, however, considerable data to indicate that fry production observed in the higher ranges in Prince William Sound also agree well with observations in Southeastern Alaska and Canada (Hunter, 1959) (Merrell, 1960) (Parker, 1962) (Pritchard, 1958) (Wickett, 1958). Projecting the Prince William Sound mean fry density return relationships to the fry densities observed in several large areas in Southeastern Alaska where fry production data is available and coupled with a consideration of adult escapement distribution reveals the following prognosis:

#### Strongest areas of return and catch in 1965

1. Above average parent escapements to most streams of Baranof Island, Chichagof Island, and Admiralty Island in 1963 coupled with excellent fry production (average of 32.6 pink fry per .1 sq. m for the streams examined) should produce a strong Icy Strait-Cross Sound fishery in 1965, in a similar magnitude as 1963.
2. Average to good parent escapements on the West Coast of Prince of Wales Island resulting in good fry production (average of 23.1 pink fry per .1 sq. m for streams examined) should result in a fair to strong Cordova Bay fishery.

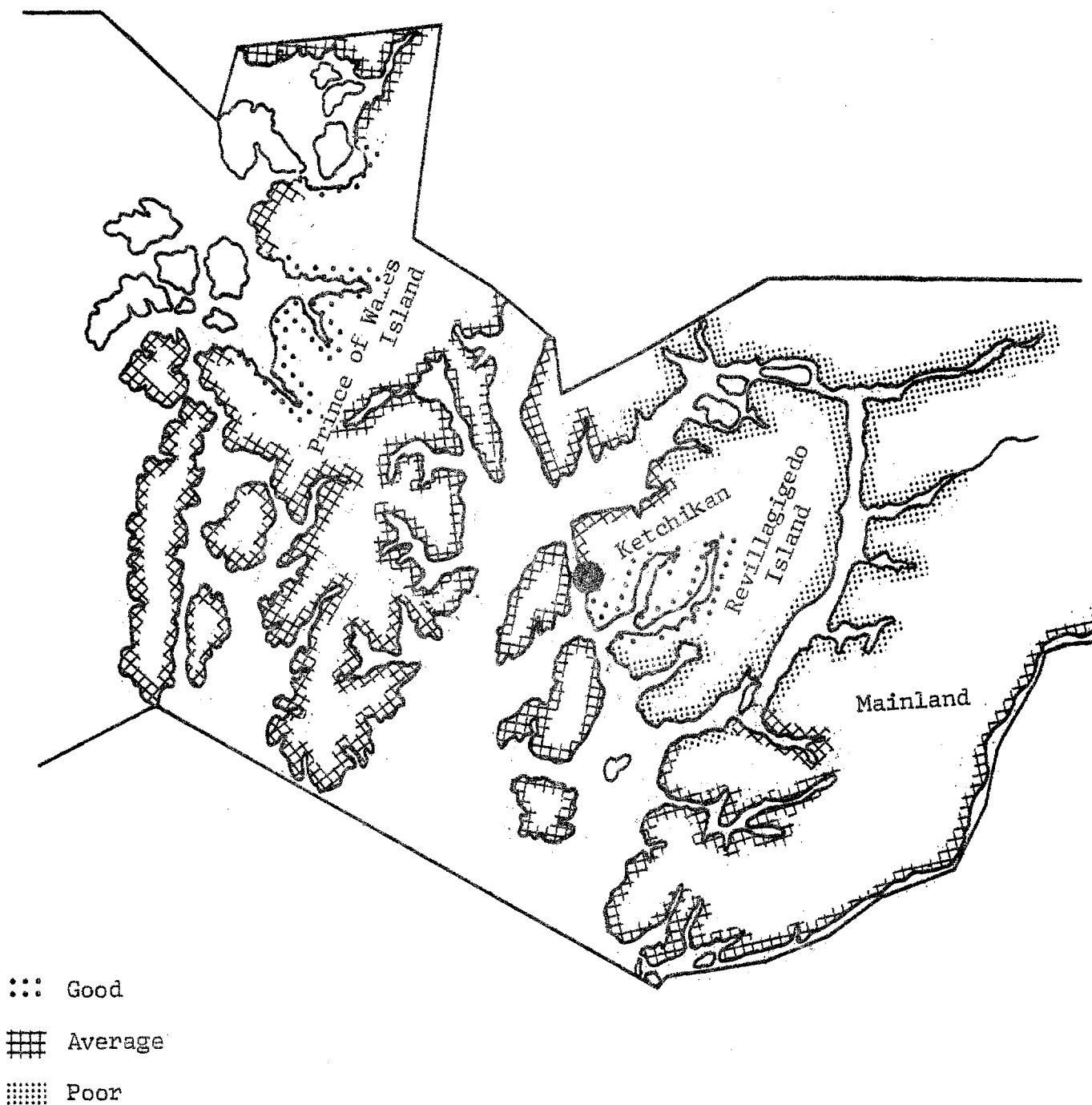


Figure 8. Relative levels of escapement in the Ketchikan District in 1963.

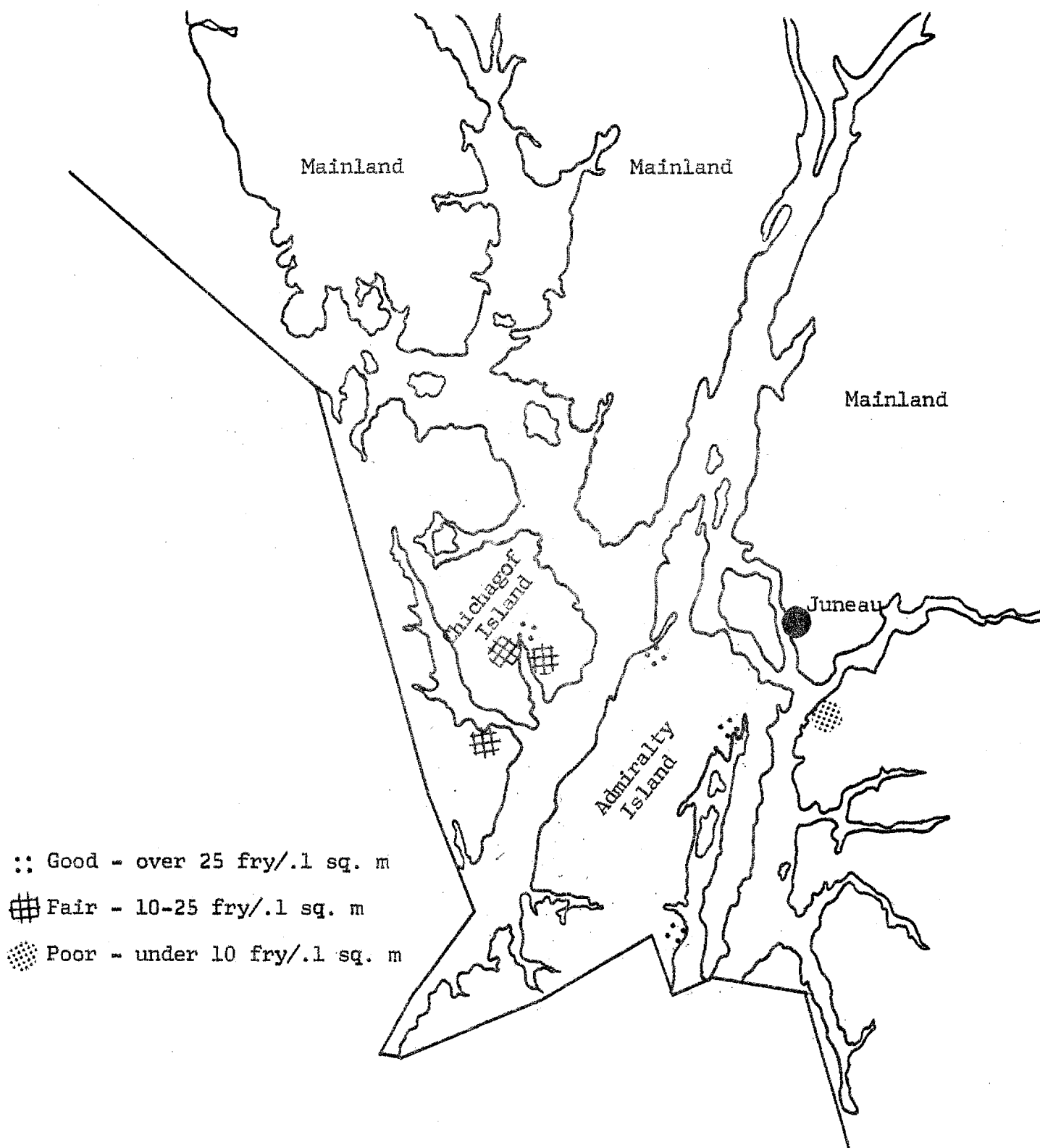


Figure 9. Relative abundance of pink salmon fry per .1 sq. m recovered in 8 streams in the Juneau District in February-March-April, 1964.

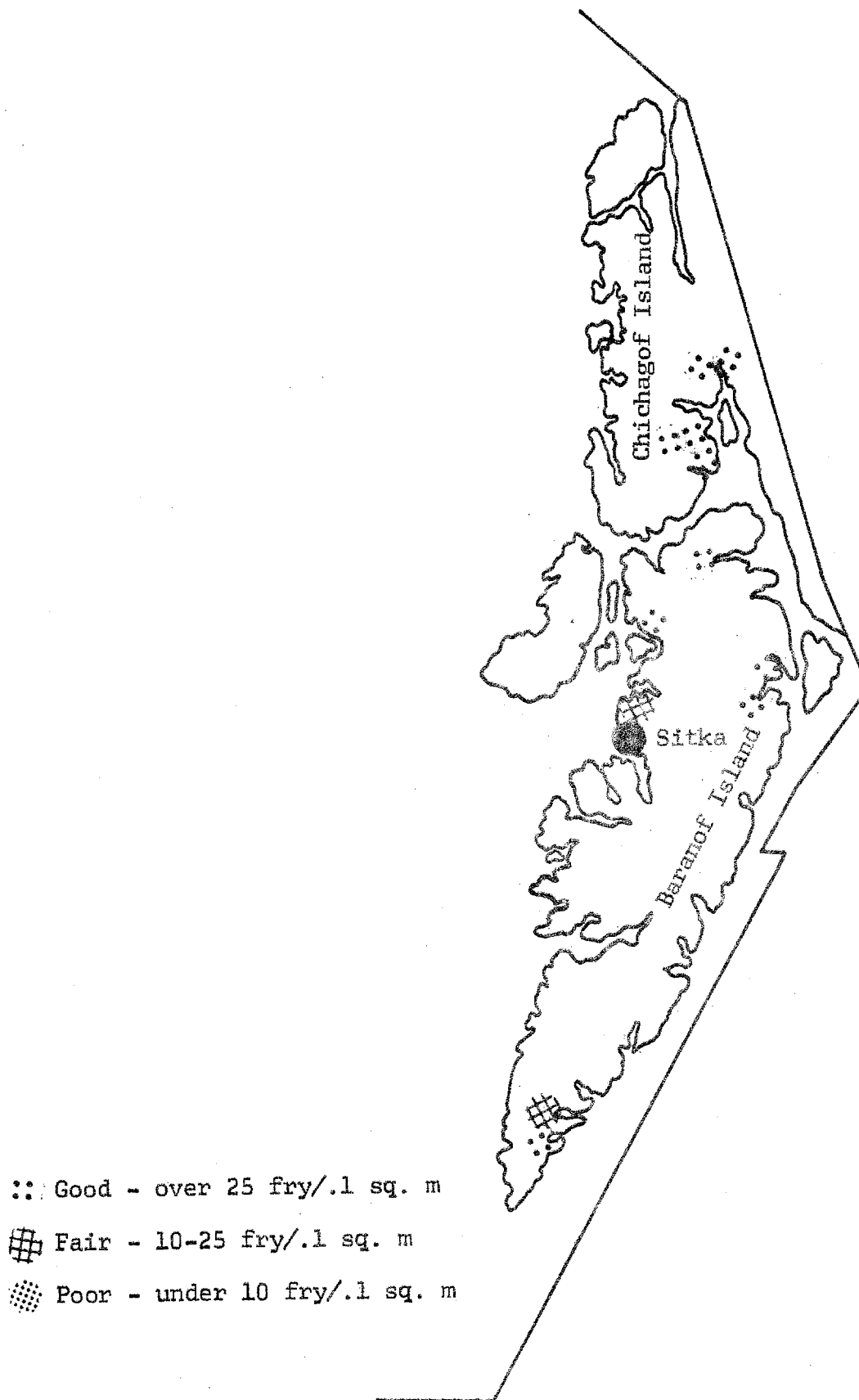


Figure 10. Relative abundance of pink salmon fry per .1 sq. m recovered in 12 streams in the Sitka District in February-March-April, 1964.

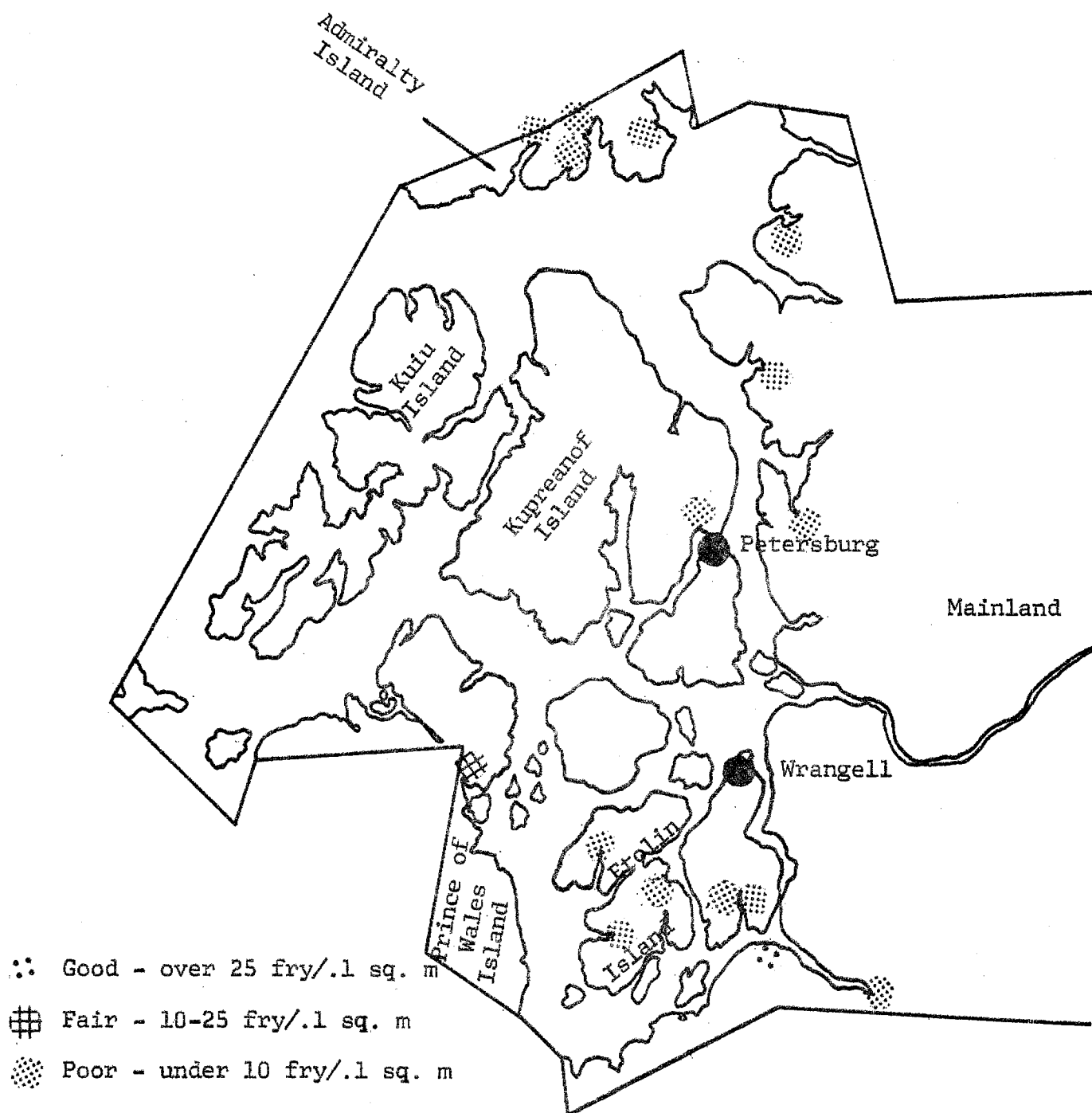


Figure 11. Relative abundance of pink salmon fry per .1 sq. m recovered in 16 streams in the Petersburg District in February-March-April, 1964.

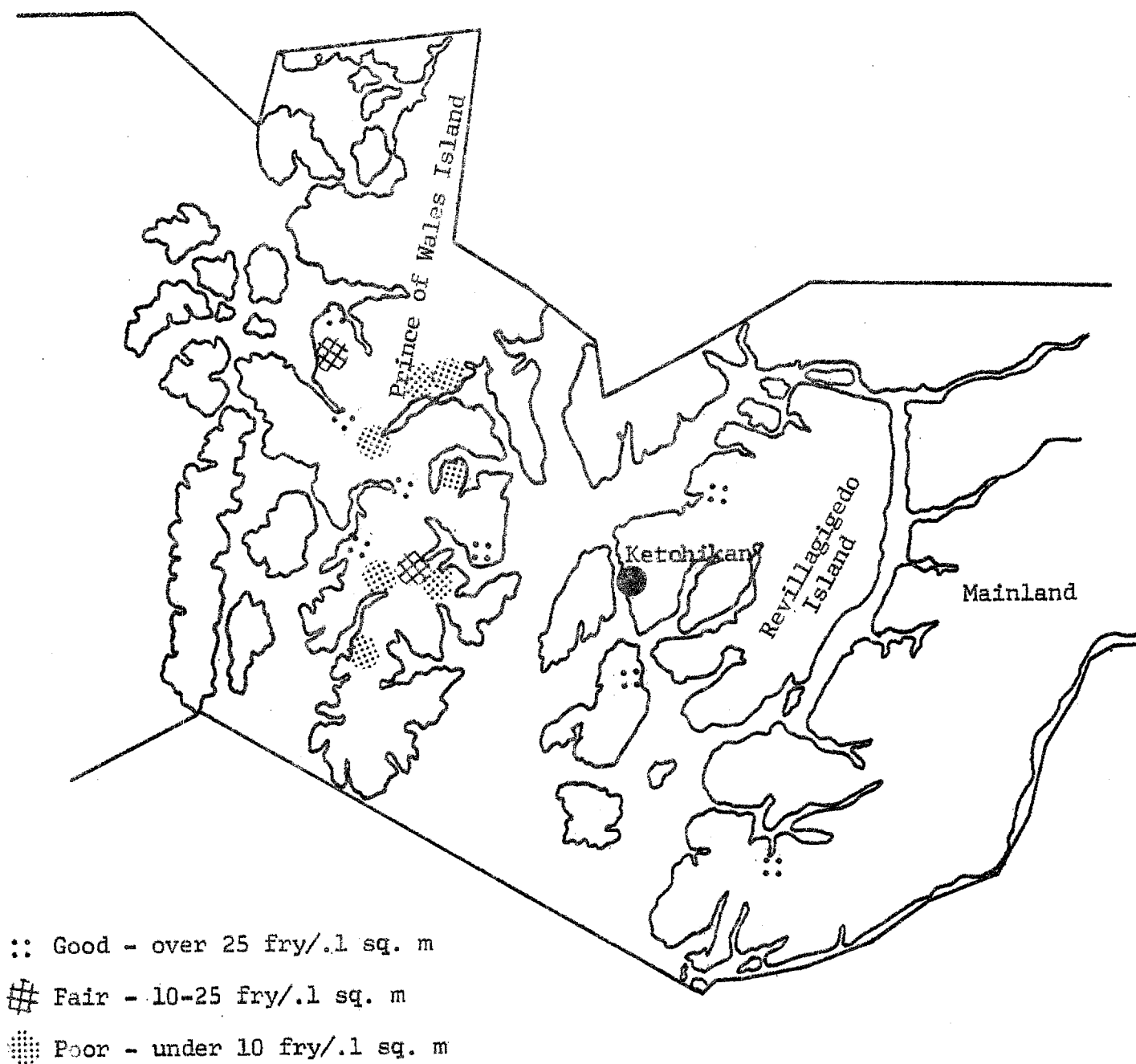


Figure 12. Relative abundance of pink salmon fry per .1 sq. m recovered in 17 streams in the Ketchikan District in February-March-April, 1964.

# 1964 Pre-emergent Fry Density by Area

Following is an area summary of the 1964 pre-emergent density distribution in the Southeastern Alaska sampling effort.

## I. Grouped stream densities<sup>1</sup>

Management Areas	General Area	# of Streams Sampled	Pink Salmon Fry/.1 sq. meter	Relative <sup>2</sup> Density
9, 11, 12, 13	Baranof, Chichagof and Admiralty Islands	19	32.6	Good
9, 10	Pybus, Gambier, Eliza Bays	4	4.2	Poor
6, 7	Petersburg District, Islands	8	4.2	Poor
7, 8, 10, 11	Petersburg-Juneau District, Mainland	4	6.3	Poor
3	West Coast Prince of Wales Island	7	23.1	Fair
2	East Coast Prince of Wales Island	5	7.6	Poor

## II. Individual stream densities

7	#18 Anan Creek	1	42.5	Good
1	#K21 Humpback Creek	1		
	Upstream		57.9	Good
	Downstream		9.4	Poor
1	#K112 Nadzaheen	1	35.5	Good
2	#K156 Sunny Creek	1	91.5	Good
1	#K84 Traitors Cove	1		
	Area 20		58.2	Good
	Area 24		10.1	Fair
6	#108 Whale Pass	1	19.6	Fair

<sup>1</sup> Not including individual streams listed below.

<sup>2</sup> Based upon average of area-wide fry density-return runs observed in Prince William Sound.

3. Bradfield Canal should have a moderate to strong fishery resulting primarily from a good parent escapement to Anan Creek followed by excellent fry production of 42.5 pink fry per .1 sq. m in the area sampled.

#### Weakest areas of return and catch in 1965

The average to poor parent escapements in 1963 occurring throughout the major portion of the mainland and in the inner-island areas south of Admiralty Island to Boca de Quadra (with some exceptions) followed by fry densities of 4.2 to 6.3 pink fry per .1 sq. m in 1964 suggests that these will be the weakest areas of adult return in 1965. A limited sample of three streams in the inner-island area of the Ketchikan District with pink fry densities between 10.1 per .1 sq. m to 57.9 suggests that the return to that area could be better than the inner-island section north of the Ketchikan District.

#### Others

1. The east coast of Prince of Wales Island received poor parent escapements south of Port Johnson in 1963 and average to good escapements north of that point. The average number of pink salmon fry recovered in five streams in this area was 7.0 per .1 sq. m. Excellent production of 91.5 pink fry per .1 sq. m was observed at Sunny Creek in Chomley Sound and 19.6 per .1 sq. m at Whale Pass. The return to this area should be considerably less than in 1964 with the possibility of a fair return to the Chomley Sound and Whale Pass areas. The Whale Pass returns should be reflected in the Red Bay-Lake Bay fishery.
2. Good escapements into the Pybus-Gambier Bay areas of Admiralty Island was followed by poor fry recovery of 4.2 pink fry per .1 sq. m in 1964. Because of icing conditions in the bays we were unable to sample the two large head streams and for this reason the densities observed may reflect our inability to sample the productive area rather than failure of the run due to mortality.

#### Acknowledgments

Thanks are due the following for their assistance:

The Department of Fish and Game, Vessels Section for their assistance during the sampling period. Especially Captain Henry C. Museth of the M/V AUKLET and Captain Charles Newland of the M/V KITTIWAKE, who were in part responsible for the success of the sampling program carried out from their vessels during the months of February, March, and part of April.

Area management biologists Jim Parker, Steve Smedley, Norm Johnston, Carl Rosier, and their assistants for their help in stream selection, providing escapement data and giving first hand information of stream located in their respective districts.

Department biologist Tom Richardson for his valuable assistance of one sampling crew while they were working in the Petersburg area.

Dr. William J. McNeil of the Bureau of Commercial Fisheries, Auke Bay Laboratory for his assistance in formulating the Southeastern Alaska pre-emergent sampling scheme and the contribution of data from Lovers Cove and Sashin Creeks.

Chester R. Mattson of the Bureau of Commercial Fisheries, Auke Bay Laboratory for the contribution of data from Traitors Creek.

Mr. Phillip Shapely of the Fisheries Research Institute, University of Washington for the contribution of data from Harris River and Twelvemile Creek.

Mr. Warren Pellett who contributed to the success of the sampling effort by acting as crew leader for one of the sampling crews.

### Literature Cited

- Hunter, J.G. 1959. Survival and production of pink and chum salmon in a coastal stream. J. Fish. Res. Bd. Canada. 16(6): 835-886.
- McNeil, William J. 1962. Mortality of pink and chum salmon eggs and larvae in Southeast Alaska streams. PhD. Thesis, University of Washington, 270 p.
- Merrell, T.R., Jr. 1960. Freshwater survival of pink salmon at Sashin Creek, Alaska. Symposium on Pink Salmon. H.R. MacMillan Lectures in Fisheries. 59-72.
- Noerenberg, Wallace H. 1964. Forecast research on 1964 Alaskan pink salmon fisheries, Alaska Department of Fish and Game, Informational Leaflet No. 36, 52 p. (Processed).
1963. Salmon forecast studies on 1963 runs in Prince William Sound. Alaska Department of Fish and Game, Informational Leaflet No. 21. Cordova, Alaska. 17 p. 6 figs. (Processed).
1961. Observations on spawning and subsequent survival of fry of the 1960 salmon runs in Prince William Sound, Alaska. Alaska Department of Fish and Game, Memorandum No. 5, Cordova, Alaska. 22 p. 6 figs. (Processed).
- Parker, R.R. 1962. A concept of the dynamics of pink salmon populations. Studies of the Fish. Res. Bd. Canada. #714: 203-211.
- Pritchard, A.L. 1958. Efficiency of natural reproduction of the pink salmon (*Oncorhynchus gorbuscha*) in McClinton Creek, Masset Inlet, B.C. J. Fish. Res. Bd. Canada. 7(5): 224-236.
- Wickett, W.P. 1958. Review of certain environmental factors affecting the production of pink and chum salmon. J. Fish. Res. Bd. Canada. 15(5): 1103-1126.

The Alaska Department of Fish and Game administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information please write to ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; U.S. Fish and Wildlife Service, 4040 N. Fairfax Drive, Suite 300 Webb, Arlington, VA 22203 or O.E.O., U.S. Department of the Interior, Washington DC 20240.

For information on alternative formats for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-6077, (TDD) 907-465-3646, or (FAX) 907-465-6078.